

REVIEW OF *HALTICHELLA* SPINOLA IN THE NEARCTIC
REGION (HYMENOPTERA: CHALCIDIDAE)

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Abstract.—Five species of *Haltichella* Spinola are recognized in the Nearctic region: *H. onatas* (Walker), *H. ornaticornis* Cameron, *H. perpulcra* (Walsh), *H. rhyacionia* Gahan, and *H. xanticles* (Walker). The females and males of each species are diagnosed. A neotype is designated for *H. perpulcra*. The males of *H. onatas*, *H. ornaticornis*, *H. perpulcra*, and *H. xanticles* were previously undescribed; voucher specimens of each are designated. Biological and distributional information is summarized for each species. A key to the Nearctic species and characters to distinguish *Haltichella* from other Nearctic Chalcididae are presented.

Key Words: *Haltichella*, review, Chalcididae, Nearctic

Haltichella Spinola is one of fifteen genera of Chalcididae in America north of Mexico and is known from all zoogeographical regions. This genus was described by Spinola (1811) with *Chalcis pusilla* Fabricius as the type-species. Taxonomic treatments of *Haltichella* include the European fauna (Boucek 1951), the Russian fauna (Nikolskaya 1952, 1960), the African fauna (Schmitz 1946), and the Japanese fauna (Habu 1960, 1962). As no comprehensive taxonomic work for the Nearctic species exists, I present a review of Nearctic *Haltichella*. Past literature on *Haltichella* is cataloged in Peck (1963), Burks (1979), and DeSantis (1979).

Haltichella are among the smallest Chalcididae, length rarely exceeding 4 mm. They are black and commonly with orange or orange-brown on the legs, antennae, and rarely, the tegulae. The wings vary, being hyaline, smoky, or clouded in a specific pattern. Males differ from females by having a shorter abdomen with a blunt apex (Fig. 2), robustly filliform antennae (Fig. 3), and in

some species, in color and forewing clouding.

A generic revision of the American Chalcididae is in progress (Boucek pers. comm.); therefore, a generic description of *Haltichella* is omitted. However, to facilitate identification of this genus for the Nearctic region, the following characters are diagnostic (Fig. 1):

hindtibia truncate distally, two spurs present (*Haltichellinae*); marginal vein reaching anterior margin of wing, postmarginal and stigmal veins present (*Haltichellini*); tergite 1 dorsally with longitudinal carinae at base, originating from a transverse carina; scutellum rounded, slightly bilobed, or rarely, strongly bilobed posteriorly but never with large, long projecting processes or a median tooth; vertex of head not produced into horns; frontal carina weak, not forming an arch above anterior ocellus; color predominantly black.

Useful species characters include the length of tergite 2 (medially); sculpture of tergite 1 (dorsally); color of the antennae, tegulae, and legs (especially the hindfemur); and presence or absence of clouding in the forewing. Besides the above characters, few diagnostic and constant characters exist to distinguish the Nearctic species. Rarely, individual specimens are difficult to identify because of variation in the sculpture of tergite 1 and coloration. If possible, a series of specimens from a locale should be examined. However, more than one species can be taken together such as *Haltichella rhyacionia* Gahan and *Haltichella xanticles* (Walker).

Haltichella are primary parasitoids of Lepidoptera, secondary parasitoids of braconid wasps, and once recorded as a secondary parasitoid of a tachinid fly (Freeman and Berisford 1979). Four of the five Nearctic species have been reared with three species being both primary and secondary parasitoids and the fourth species as only a secondary parasitoid. Primary hosts include several economically important lepidopterous pests (see host sections). During this revision, many new host records were obtained from label data.

In the examination of several thousand specimens, the distributional information on *Haltichella* was greatly improved and shows the species to be widely distributed in the Nearctic region (Fig. 5). *Haltichella* are commonly collected in Malaise-type traps and pan traps or by sweeping vegetation. Some species (e.g. *H. xanticles*) occur in a variety of habitats, ranging from deserts to coniferous forests. *Haltichella* are common in collections, ranking third in number only to the Chalcididae genera *Spilochalcis* and *Invreia*.

Abbreviations include T1 for tergite 1, etc. All measurements were made in the flattest plane possible. Specimens were examined at 30 to 100 \times . A mylar, glare reducing screen was used in lighting specimens.

Collections examined and museum ac-

ronyms are as follows: American Museum of Natural History, New York; Bernice P. Bishop Museum, Hawaii; British Museum of Natural History, London (BMNH); California Academy of Sciences, San Francisco; California Collection of Arthropods, California Department of Food and Agriculture, Sacramento; California State University, Fresno; California State University, Sacramento; Canadian National Collection, Ottawa; Florida Collection of Arthropods, Florida Department of Agriculture and Consumer Affairs, Gainesville; Fresno County Department of Agriculture, Fresno, California; Illinois Natural History Survey, Champaign; Los Angeles County Museum of Natural History, California; Natural History Museum of San Diego, California; Oregon Department of Agriculture, Salem; Royal Ontario Museum, Toronto; Texas A&M University, College Station; Tulare County Agricultural Commissioner's Office, Visalia, California; United States National Museum of Natural History, Washington, D.C. (USNM); University of California, Berkeley; University of California, Davis; University of California, Riverside; J. A. Halstead personal collection; H. A. Hespeneheide personal collection; R. D. Haines personal collection.

KEY TO NEARCTIC SPECIES OF *HALTICHELLA* SPINOLA

1. Females, ovipositor present 2
- Males, ovipositor absent 6
2. T2 medially less than $\frac{1}{4}$ the length of T1
..... *perpulcra* (Walsh)
- T2 medially greater than $\frac{1}{4}$ the length of T1 ... 3
3. T1 punctate to coriaceous dorsally
..... *rhyacionia* Gahan
- T1 polished dorsally, without sculpture 4
4. Forewing with one or two clouded spots, rarely
hyaline; tegula orange, hindfemur black or with
only apex orange *ornaticornis* Cameron
- Forewing hyaline, tegula black, hindfemur not
as above 5
5. Legs and antennae black, forewing hyaline or
smokey *xanticles* (Walker)
- Legs (except apical $\frac{1}{2}$ of hindfemur occasion-

- ally) and antennae orange, forewing hyaline
 *onatas* (Walker)
6. T1 basally with 2 longitudinal carinae, flagellum $2\frac{1}{2} \times$ height of head *perpulcra* (Walsh)
- T1 basally with 3 or more longitudinal carinae, flagellum less than $2\frac{1}{2} \times$ height of head 7
7. T1 punctate to coriaceous dorsally
 *rhyacionia* Gahan
- T1 polished dorsally, without sculpture 8
8. Tegula orange, rarely black; forewing with one or two clouded spots, rarely hyaline
 *ornaticornis* Cameron
- Tegula black, forewing hyaline or smokey but never with a clouded spot 9
9. Hindfemur with basal $\frac{1}{3}$ to $\frac{1}{2}$ orange, fore and middle legs and scape orange *onatas* (Walker)
- Hindfemur black, or with orange markings at base and/or apex; fore and middle legs and scape black or brown *xanticles* (Walker)

Haltichella onatas (Walker)

Fig. 5

- Hockeria onatas* Walker, 1843: 146, ♀.
Haltichella onatas (Walker); Walker, 1846: 7.
Conura onatas (Walker); Walker, 1871: 41.
Haltichella longicornis Ashmead, 1887: 185; Burks, 1975: 164.
Haltichella onatas (Walker); Burks, 1975: 164, Lectotype designation.
Haltichella onatas (Walker), MALE DIAGNOSIS.

Diagnosis.—*H. onatas* is the only Nearctic species with the antennae (in male scape only) and legs (in male only basal $\frac{1}{3}$ to $\frac{1}{2}$ of hindfemora and apex of hindtibiae) orange. The characters: length of T2 medially greater than $\frac{1}{4}$ that of T1, T1 dorsally polished, with three or more (usually) longitudinal carinae at base, hyaline forewing, black tegulae, and orange color are distinguishing.

Female.—Black, with antennae and legs orange to orange-brown.

Male.—Like female except antennae robustly filiform, base of hindfemora and apex of hindtibiae orange, and abdomen shorter with apex blunt.

Variation.—Hindfemur coloration is somewhat variable as noted in the key. (♀) Length 2–4 mm. The hindfemur of one fe-

male (Type No. 2627 U.S.N.M., originally included in the syntype series of *H. xanticles*) is black, except basally. (♂) Length 2–3 mm.

Type and voucher specimens.—Lectotype ♀ with data: "B.M. Type Hym. 5. 553. I477a, St. Jon's Bluff, *Hockeria Onatas* Walker." I designate a male specimen as a voucher specimen—red label marked: "VOUCHER MALE, *Haltichella onatas* (Walker), ♂, det. J. A. Halstead 1987" and with data: "Crescent City, Fla. Apr '08, Van Duzee, MCVanDuzee Collector, MCVanDuzee Collection, Collection of the CALIFORNIA ACADEMY OF SCIENCES, San Francisco, Calif." Both specimens in the United States National Museum.

Hosts.—LEPIDOPTERA, Cosmopterygidae: *Pyroderces rileyi* (Wals.). Olethreutidae: *Lasperyresia pomonella* (L.) pupa, *Grapholitha molesta* (Busck). Gelechiidae: *Isophrictis similiella* (Chamb.). Psychidae: *Prochalia pygmaea* Barnes & McDunnough. A specimen (New Orleans, Louisiana) was reared from a leaf skeletonizer on *Phalaris canariensis* (Canary Grass). Ashmead (1887) reared a specimen from the gall of *Xanthoteras politum* (Bassett) (Hymenoptera: Cynipidae). It is likely that a lepidopteran was inhabiting the gall. A specimen (Monticello, Florida) was reared from a stalked braconid wasp cocoon on *Catocala* (Lepidoptera: Noctuidae); thus, it is also a secondary parasitoid of Braconidae.

Haltichella ornaticornis Cameron

Fig. 5

- Haltichella ornaticornis* Cameron, 1884: 100, ♀.
Haltichella ornaticollis Cameron; Howard, 1885: 36.
Haltichella ornaticornis (Cameron); DeSantis, 1979: 69.
Haltichella ornaticornis Cameron, MALE DIAGNOSIS.

Diagnosis.—*H. ornaticornis* is the only Nearctic species with one or two clouded

spots in the forewing. The characters: length of T2 medially greater than $\frac{1}{4}$ that of T1, T1 dorsally polished, with three or usually more longitudinal carinae at base, orange tegulae, black hindfemora, orange and black antennae (in female), and black antennae (in male) are distinguishing.

Female.—Black, with the following areas orange: basal $\frac{1}{2}$ of scape, flagella 1–3, tarsi, base and apex of tibiae, trochanters, and tegulae. Forewing with a clouded spot from under marginal vein and stigma to middle of wing.

Male.—Like female except antennae black and robustly filiform, and abdomen shorter with apex blunt. Forewing like female.

Variation.—(♀) Length 2–4 mm. Forewing clouding somewhat variable. Most specimens are like the holotype, but some with forewing hyaline or with two clouded areas (one under the marginal vein and another fainter spot between it and apex of wing). (♂) Length 2–3 mm. Commonly, the forewing is hyaline. The tegulae are rarely black.

Comments.—Females that lack forewing clouding can be distinguished by coloration and T1 and T2 characters.

Type and voucher specimens.—Holotype ♀ with data: "Bugaba, Panama, Champion, BM Type Hym. 5, 288, *Haltichella ornaticornis* Cameron." I designate a male specimen as a voucher specimen—red label marked: "VOUCHER MALE, *Haltichella ornaticornis* Cameron, ♂, det. J. A. Halstead 1987" and with data: "MEXICO, Chiapas, Palenque, 10 Sept 1974, GBohart, WHanson, UTAH STATE UNIVERSITY." Both specimens in the British Museum of Natural History.

Host.—Unknown.

Haltichella perpulchra (Walsh)

Figs. 4, 5

Hockeria perpulchra Walsh, 1861: 258, ♀.
(Paper not seen by author.)

Hockeria perpulchra Walsh; Cresson, 1862: 228 (erroneous subsequent spelling).

Conura perpulchra (Walsh); Walker, 1871: 41.

Hockeria perpulchra Walsh; Thomas, 1881: 39, Original description repeated.

Haltichella perpulchra (Walsh); Howard, 1885: 37.

Haltichella perpulchra (Walsh), NEOTYPE DESIGNATION ♀, MALE DIAGNOSIS.

Diagnosis.—*H. perpulchra* is the only Nearctic species with the length of T2 medially less than $\frac{1}{4}$ that of T1 (Fig. 4), and (in male) flagellum $2\frac{1}{2} \times$ the height of head. The characters: hyaline forewing, T1 dorsally polished, with two longitudinal carinae at base (in both sexes) and between these carinae 0–5 minute carinae (in female), and black color are distinguishing.

Female.—Black, with base and apex of fore and middle tibiae, apex of hindtibiae, and tarsi orange.

Male.—Like female except antennae longer and robustly filiform, and abdomen shorter with apex blunt.

Variation.—(♀ and ♂) Length 2–4 mm.

Type and voucher specimens.—The type specimen(s) could not be found and are believed to have been destroyed in the Chicago fire of 1873. I was unable to obtain Walsh's (1861) paper of the original description. Thomas (1881), republishing Walsh's (1861) description, presented key characters: "abdomen ovate, glabrous, first joint equal to three-fifths of its entire length, and highly polished, intermediate joints very narrow," "wings hyaline," and "general color black" (in combination with other characters in the description), which are adequate to distinguish this species. Walsh's description appears to have been based on a female. I designate a female specimen as NEOTYPE—yellow label marked: "NEOTYPE, *Haltichella perpulchra* (Walsh), ♀, det. J. A. Halstead 1987" and with the data: "MEXICO, Nyarit, San Blas, II-14-1974, G. E. Bohart, UTAH STATE UNIVERSITY." I designate a male specimen as a voucher specimen—red label marked:

“VOUCHER MALE, *Haltichella perpulera* (Walsh), ♂, det. J. A. Halstead 1987” and with data: “MEXICO, Chiapas, Palenque, 10 Sept 1974, GBohart, WHanson, UTAH STATE UNIVERSITY.” Neotype and voucher specimen of male deposited in the USNM.

Host.—Cocoons of *Apanteles militaris* (Walsh) (Hymenoptera: Braconidae) on *Pseudaletia unipuncta* (Haw.) (Lepidoptera: Noctuidae).

Haltichella rhyacionia Gahan

Figs. 1–3, 5

Haltichella rhyacioniae Gahan, 1927: 545, ♀ and ♂.

Haltichella rhyacionia Gahan; Burks, 1979: 861.

Haltichella rhyacionia Gahan, MALE DIAGNOSIS.

Diagnosis.—*H. rhyacionia* is the only Nearctic species with T1 dorsally coriaceous to punctate. The characters: length of T2 medially greater than $\frac{1}{4}$ that of T1 (Figs. 1–2), T1 with three or usually more longitudinal carinae at base, hyaline forewing, and black legs and tegulae are distinguishing.

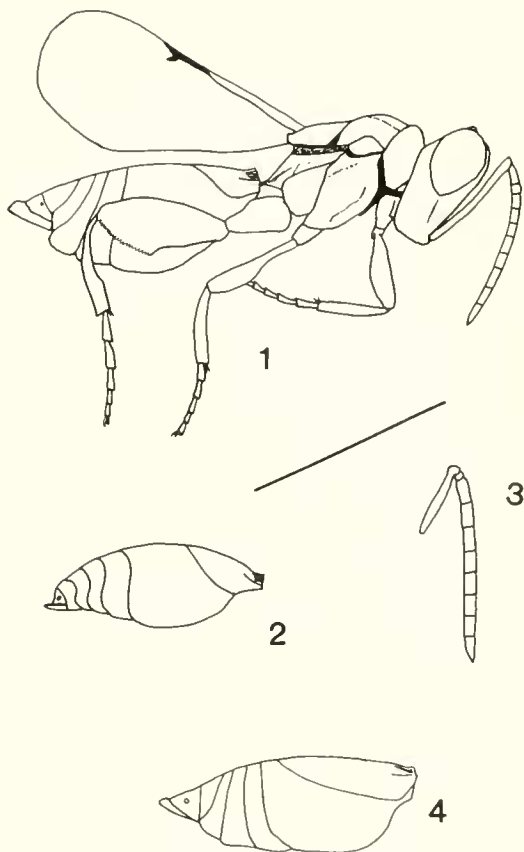
Female.—Black, with apices of tibiae orange.

Male.—Like female except antennae robustly filiform and abdomen shorter with apex blunt.

Variation.—(♀ and ♂) Length 2–4 mm. T1 coriaceous to punctate. The sculpture on T1 dorsally is rarely faint and confined to the basomedial area. The flagellum is rarely orange.

Types.—Holotype ♀ and allotype ♂ in USNM with data: “ex *Rhyacionia frustana* Comst, Falls Ch Va, 7/16/24, R. A. Cushman coll., Type No. 40178 U.S.N.M., *Haltichella rhyacioniae* Gahan Type.”

Hosts.—LEPIDOPTERA, Olethreutidae: *Rhyacionia bushnelli* (Busck), *R. frustana*, *R. rigidana* (Fern). Lyonetiidae: *Bucculatrix thurberiella* (Busck). DIPTERA, Tachinidae: *Lixophaga mediocris* Towns.



Figs. 1–4. *Haltichella rhyacionia* Gahan. 1, Habitus of female. 2, Abdomen of male (lateral view). 3, Antenna of male (lateral view). 4, Abdomen of *Haltichella perpulera* female (lateral view). Scale line 1.5 mm.

Haltichella xanticles (Walker)

Fig. 5

Hockeria xanticles Walker, 1843: 147, ♀.

Haltichella xanticles (Walker); Walker, 1846: 7.

Comura Xanticles (Walker); Walker, 1871: 41.

Haltichella americana Howard, 1885: 36; Burks, 1975: 165.

Haltichella xanticles (Walker); Burks, 1975: 165, Lectotype designation.

Haltichella xanticles (Walker), MALE DIAGNOSIS.

Diagnosis.—*H. xanticles* is similar to *H. rhyacionia*, but differs in coloration and the



Fig. 5. Distribution of Nearctic species of *Haltichella*. One species' range includes the Neotropical region. A symbol in a state, province, or country indicates the species is widely distributed in that region.

sculpture of T1 dorsally. The characters: length of T2 medially greater than $\frac{1}{4}$ that of T1, T1 dorsally polished, with three or usually more longitudinal carinae at base, hyaline forewing, and black tegulae and legs are distinguishing.

Female.—Black, with base and apex of fore and middle tibiae, apex of hindtibiae, and tarsi orange.

Male.—Like female except antennae robustly filiform and abdomen shorter, with apex blunt.

Variation.—(♀ and ♂) Length 2–4 mm. The hindfemur is rarely dark red-brown.

Type and voucher specimens.—Lectotype ♀ with data: "B.M. Type Hym. 5.554, I478a, St. Jon's Bluff, *Hockeria Xanticles* Walker." I designate a male specimen as a

voucher specimen—red label marked: "VOUCHER MALE, *Haltichella xanticles* (Walker), ♂, det. J. A. Halstead 1987" and with data: "Mill Valley, Marin Co., Cal., 2. VII. 50, H. B. Leech Collector, Collection of the CALIFORNIA ACADEMY OF SCIENCES, San Francisco, Calif." Both specimens in the USNM.

Hosts.—LEPIDOPTERA, Lymantriidae: *Lymantria dispar* (L.). Olethreutidae: *Rhyacionia buoliana* (Schiff.), *Rhyacionia* sp., *Grapholitha molesta*. Gelechiidae: *Exoteleia pinifoliella* (Chamb.). Coleophoridae: *Coleophora laricella* (Hbn.). Lyonetiidae: *Bucculatrix canadensisella* (Chamb.). Psychidae: *Solenobia walshella* Clem. Pyralidae: *Diorctria dischusa* Heinr. HYMENOPTERA, Braconidae: *Cotesia melanoscelus*

(Ratzeburg). Label data on one specimen (Texas, Westaco) indicates emergence with *Antonina graminis* (Mask.) (Homoptera: Pseudococcidae) from a breeding cage. Another specimen (Maine, Mtn. Desert Is.) was bred from a parasite of *Coleophora salmani* Heinr. (Coleophoridae).

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LITERATURE CITED

- Ashmead, W. H. 1887. Studies on the North American Chalcididae, with descriptions of new species, chiefly from Florida. *Trans. Amer. Entomol. Soc.* 14: 183-203.
- Boucek, Z. 1951. The first revision of the European species of the family Chalcididae (Hymenoptera). *Acta Entomol. Mus. Natl. Pragae* 27(Suppl. 1): 108 pp.
- Burks, B. D. 1975. The species of Chalcidoidea described from North America north of Mexico by Francis Walker (Hymenoptera). *Bull. Brit. Mus. Nat. Hist. (Ent.)* 32(4): 137-170.
- . 1979. Chalcididae, pp. 860-874. *In* Krombein, K. V. et al., eds., *Catalog of Hymenoptera in America North of Mexico*. Vol. I. Smith. Instit. Press. Wash., D.C. 1198 pp.
- Cameron, P. 1884. *Biologia Centrali-Americana*. Insecta. Hymenoptera. (Families Tenthredinidae-Chrysididae). Vol. I. 487 pp.
- Cresson, E. T. 1862. Catalog of the described species of North American Hymenoptera. *Proc. Entomol. Soc. Phil.* 1: 227-266.
- DeSantis, L. 1979. Catalogo de los himenopteros calcidoideos de America al sur de los Estados Unidos. Comision de Investigaciones Cientificas de la Provincia de Buenos Aires, La Plata, Argentina. 1-488.
- Freeman, B. L. and C. W. Berisford. 1979. Abundance and parasitic habits of some parasitoids of the Nantucket pine tip moth (Lepidoptera: Tortricidae). *Canad. Entomol.* 111: 509-514.
- Gahan, A. B. 1927. Four new Chalcidoid parasites of the pine tip moth, *Rhyacionia frustrana* (Comstock). *J. Agric. Res.* 34(6): 545-548.
- Habu, A. 1960. A revision of the Chalcididae (Hymenoptera) of Japan, with descriptions of sixteen new species. *Bull. Nat. Inst. Agric. Sci., ser. C, No.* 11: 131-363.
- . 1962. Fauna Japonica: Chalcididae, Leucospididae and Podagrionidae (Insecta: Hymenoptera). *Biogeogr. Soc. Japan, Nat. Sci. Mus., Tokyo, Japan.* 232 pp.
- Howard, L. O. 1885. Descriptions of North American Chalcididae from the collection of the U.S. Department of Agriculture and of Dr. C. V. Riley, with biological notes. *Bull. Bur. Entomol., U.S. Dept. Agric.* 5: 5-47.
- Nikolskaya, M. N. 1952. Chalcid fauna of the U.S.S.R. (Chalcidoidea). *Zool. Inst. Akad. Nauk SSR, Moscow No.* 44, 240 pp.
- . 1960. Fauna USSR: Hymenoptera, Vol. VII (No. 5). Chalcidoids, families Chalcididae and Leucospidae. *Zool. Inst. Akad. Nauk SSR, Moscow (n.s.) No.* 76, 221 pp.
- Peck, O. C. 1963. A catalog of the Nearctic Chalcidoidea (Insecta: Hymenoptera). *Canad. Entomol. Suppl.* 30: 1092 pp.
- Schmitz, G. 1946. Exploration du Parc National Albert, Mission G. F. De Witte (1933-1935). Chalcididae (Hymenoptera: Chalcididae). *Inst. Des Parcs Nat. Du Congo Belge, Bruxelles,* 48: 191 pp.
- Spinola, M. M. 1811. Essai d'une nouvelle classification generale des Diplolepairees. *Ann. Mus. Hist. Nat. Paris,* 17: 147-148.
- Thomas, C. 1881. Noxious and beneficial insects of the state of Illinois. *State Entomol. Rpt.* 10: 5-43.
- Walker, F. 1843. Description des Chalcidites trouvees au Bluff de Saint-Jean, dans la Floride orientale, par MM. E. Doubleday et R. Forester. *Soc. Entomol. France, Annals* (2)1: 145-162.
- . 1846. List of the specimens of Hymenopterous insects in the collection of the British Museum. Part I—Chalcidites. vi, 100 pp. London.
- . 1871. Notes on Chalcididae. 129 pp., 62 figs. London.